XXI. A NEW AMERICAN CYBELE.

By J. E. Narraway and Percy E. Raymond.

American specimens of trilobites of the genus *Cybele* are so extremely rare that a fairly complete individual discovered by the senior writer in the Black River formation near Ottawa, Canada, adds considerably to our knowledge of American forms. Clarke has described a nearly complete specimen of a species of this genus from the Mohawkian of Minnesota (Paleontology of Minnesota, Volume 3, part 2, page 762, 1897); Billings described the pygidium of another species from the Quebec group of Newfoundland (Paleozoic Fossils of Canada, Volume 1, page 292, 1865); Ruedemann described a partial pygidium from the Lower Trenton at Rysedorph Hill, near Albany, New York (Bulletin of the New York State Museum, Number 49, page 66, 1902); and Raymond has described a species from the Chazy formation at Valcour, New York. This last species was also founded on specimens of the pygidium.

The specimen now to be described is more perfectly preserved than any so far found, except the one described by Clarke, from Minnesota, and fortunately preserves the glabella, a portion not previously recognized in American forms of this genus.[1] This specimen, which is a little less than five-eighths of an inch in length, shows the glabella and the outline of one side of the cephalon, a large part of the free and fixed cheek having been chipped off. The axial lobe is complete, but about half of the left pleuron is gone, the fracture being at a low angle with the axis, and not far from the axial lobe. The first six segments of the thorax have also been somewhat damaged on the right side. The pygidium is complete except for a small loss at the distal end. All the important points, except the position of the eye and the

[1] *Encrinurus mirus* Billings, which was the first American species of *Cybele* described (see locality cited above) was founded on detached glabellæ and pygidia. The pygidium is undoubtedly that of a *Cybele*, but there is some doubt about the cranidium. If it really is that of a *Cybele*, it is distinctly of the European type with three deeply incised glabellar furrows. Dr. Clarke has suggested that this cranidium may belong to a species of *Amphion* (*Pliomera*).

form of the hypostoma, can be made out. It is to be hoped that the attention of collectors may be again directed to these rare trilobites by the recent finds and that more good specimens may be brought to light.

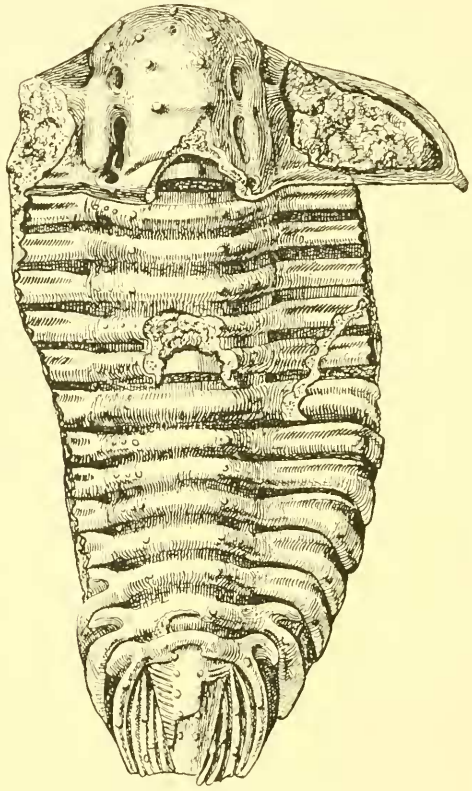

FIG. 1. Dorsal view of the test of a specimen of *Cybele ella* sp. nov. enlarged 7 diameters.

Order PROPARIA Beecher.

Family ENCRINURIDÆ Linnarsson.

Cybele ella sp. nov.

The single specimen now known is 14 millimeters long, and the greatest width, at the genal angles of the cephalon is 12 millimeters. Test depressed, wide at the genal angles, and tapering rather rapidly to a very small pygidium. Axial lobe narrow, convex, the pleura flattened and curving down abruptly at the sides.

Cephalon short, very wide. Glabella narrow, convex; cheeks depressed convex, lower than the glabella. Length of cephalon, 4 millimeters; width, 12 millimeters.

Glabella narrow behind, expanding toward the front. Glabellar furrows represented by three pairs of pits, the second and third pit on either side united into a long depression parallel to the axis, thus forming side lobes to the glabella. Behind the third pair of pits, representing the third glabellar furrows, are a pair of rather deep pits in the line of the neck furrow. Leading diagonally forward and outward from these pits are narrow depressions which bound the posterior ends of the side lobes of the glabella. The top of the glabella is marked by five pairs of pustules, and on the frontal lobe there are several more, all large and rounded. The larger pustules on the top of the glabella are connected in pairs by slight transverse ridges. On the median line of the glabella, just in front of the first pair of furrows, is a rather large circular pit. Opposite the widest part of the frontal lobe of the glabella there are, on the fixed cheeks, two deep pits not well shown in the figure.

The specimen is broken, so that a large part of both free and fixed cheeks are removed. A part of one free cheek remains, and shows a coarsely reticulated surface. The suture starts very close to the anterior end of the glabella and runs back near the outer margin of the glabella until opposite the first pair of glabellar pits. From that point its course cannot be followed. It cuts the frontal border again a short distance in front of the genal angle. The position of the eye cannot be observed, but it was probably distant from the glabella, as in other species of this genus. Such portions of the fixed cheeks as are preserved are smooth, and sharply differentiated from the free cheeks by the absence of reticulations. The suture is not very sharply impressed. The fixed cheeks are depressed, and separated from the glabellar lobes by a narrow furrow except opposite the first glabellar pits, where there is a transverse ridge extending outwardly upon the cheeks. Around the front of the free cheeks is a narrow, rounded border, and at the genal angle, a large, divergent spine, of which in this specimen only the base is preserved.

Thorax with twelve segments, the sixth one from the front a little wider and more prominent than the others. It does not appear to have borne spines as in *Cybele winchelli*, but the condition of the specimen is not such as to make this point clear. The axial lobe is

prominent, convex, and about one third the width of the thorax. The pleura are flat on the dorsal surface and rather sharply deflected at the sides, where perfect. As shown by the figure, the ends of nearly all the thoracic segments are broken on one side, and of the first five on both sides, so that their terminations cannot be made out. On each side of the axial lobe, each segment bears three pustules, the one nearest the median line being most prominent, while the two which are lower are very faint. The distal portion of each segment bears two or three rather prominent pustules, as do also the ribs on the pleura of the pygidium. On the pleura of the thorax each segment bears a deep groove which divides it into two convex portions. The anterior one is slightly smaller than the posterior in the first six segments, and back of that the two portions become even more differentiated. The posterior portion becomes swollen and somewhat club- or paddle-shaped, while the anterior portion becomes small and slips under the posterior portion of the segment ahead. Where the anterior portion of one segment strikes the posterior portion of the segment ahead, there is a narrow flange on the forward segment. This flange becomes more strongly developed and nearer the axis as the pygidium is approached, and is especially well formed on the back of the twelfth segment. The thorax is 7 millimeters long, 12 millimeters wide at the anterior end, and 5 millimeters wide at the posterior end. The axial lobe is 4.5 millimeters wide at the back of the cephalon, and 1.5 millimeters wide on the twelfth segment.

The pygidium is very small, about as wide as long. The axial lobe is wide and prominent, the pleura narrow and depressed. On the pleura are four pairs of double ribs, the first pair of which are larger than the others, and form a sort of anterior and lateral border to the pygidium. The axial lobe bears five pairs of small pustules, and has fifteen or sixteen transverse furrows which show only on the sides, and do not cross the flattened top. These transverse furrows occur over nearly the whole length of the axial lobe, which does not reach the posterior border of the pygidium. At the posterior end of the median lobe is a rather prominent, unpaired tubercle. The ribs of the pleura bear small tubercles in pairs, and end in short, blunt spines.

Locality. — The specimen here described and figured was found by Mr. J. E. Narraway in the Black River limestone on the Ontario side of the Petite Chaudiere, near Ottawa, Canada, and is in his private collection.

COMPARISON WITH OTHER SPECIES.

The junior writer is glad to take this opportunity to correct an error into which he was led by our lack of knowledge of the glabella of the American forms of *Cybele*. In describing the trilobites of the Chazy formation (ANNALS CARNEGIE MUSEUM, Vol. 3, 1905, p. 362), certain isolated glabellæ and free cheeks of a tribolite found on Valcour Island, and at Valcour, New York, were referred to the genus *Glaphurus* on account of their resemblance to similar parts of *Glaphurus pustulatus*. Now that the glabella of the American *Cybele* is known, it becomes evident that the glabellæ described as *Glaphurus primus* belong to the genus *Cybele*. At Valcour these glabellæ occur associated with the pygidia described under the name of *Cybele valcourensis* by Raymond, and it seems probable that the two parts belong to the same species. *Glaphurus primus* was described before *Cybele valcourensis* and that name must take precedence. The Chazy form should then be known as *Cybele prima*, and the name *Cybele valcourensis* should be eliminated.

Cybele ella is closely related to *Cybele prima* of the Chazy and is very probably a direct descendant, the differences being such as would be expected in an evolutionary series. In the cephalon, *Cybele prima* differs from *Cybele ella* in retaining, faintly it is true, the glabellar furrows, and, in the Chazy species, the pits which represent the inner ends of the furrows are all connected, while in the species just described, only the second and third pits are connected. There seems to be a tendency in several families of trilobites, notably in the Asaphidæ, for the primitive segmentation of the cephalon and pygidium to become obscured, forming, as a result of the process, smooth cephalic and abdominal shields. In these two species of *Cybele*, two stages of a similar process can be seen. In *Cybele prima* the outer ends of the glabellar furrows are becoming faint, and the inner ends are represented by pits. In *Cybele ella* the outer ends are entirely eliminated, and only the pits at the inner ends remain, and these have become smaller by the isolation of the first pair from the succeeding ones.

In the pygidia fewer changes have taken place. The first pair of ribs on the pleura are stronger in *Cybele ella* than in the Chazy species, and the furrows on the sides of the axial lobe are somewhat less prominent.

It is unfortunate that the glabella of *Cybele winchelli* is not known, as that was described from a much larger specimen, and is probably from a higher horizon than any of the other specimens of this genus found in this country. The pygidium of that species differs from the pygidium of *Cybele ella* in lacking the large first rib on the pleura, and in having only a very few furrows on the sides of the axial lobe. Neither does our specimen show any signs of the long spines on the ends of the sixth thoracic segment, but that may be due to imperfections in the material. Both species have rather coarse spines at the genal angles.

From all the Russian species of *Cybele*, our species differs markedly, not only in the presence of a genal spine, but also in the structure of the glabella. With the exception of *Cybele Grewingki* Schmidt, *Cybele Kutorgæ* Schmidt, and *Cybele Revaliensis* Schmidt, all the Russian species have the glabellar furrows sharply impressed. In the three species just mentioned, the glabellar furrows are represented by pits which are nearly isolated, but the pits are not connected as in *Cybele prima* or *Cybele ella*.

Aside from the structure of the glabella, the American and Russian forms are very similar, and, as Ruedemann has remarked, it is probable that the American forms have been developed from European types.